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RESOURCE DATA AND SPECIES AT RISK SECTION

Peace Parkland Native Grassland Stewardship Program 2001/02

Alberta Species at Risk Report No. 49

Alberta
SUSTAINABLE RESOURCE DEVELOPMENT

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Peace Parkland Native Grassland Stewardship Program 2001/02

Annette Baker

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Note:

Common plant names are from "Alberta Plants and fungi – Master species list and species group checklists" (Alberta Environmental Protection, 1993).

Butterfly names are from "Butterflies of Canada" (Layberry *et al*, 1998)

EXECUTIVE SUMMARY

Historically, native grasslands were extensive and contiguous throughout the Peace Parkland of northwest Alberta. Land development has fragmented the landscape since 1900 and less than 0.5% of the original area of upland native grassland now remains. Land managers, researchers, writers and decision makers, often overlook these grasslands and there is little information on the location, area and state of remnants.

Native grasslands provide many benefits, including habitat for plant and animal species. In particular, a number of butterfly species with disjunct populations are found in the native grasslands of the Peace and they may be at risk from habitat disturbance and further habitat fragmentation.

A pilot project was initiated in 2001 to locate, inventory and map remaining native grasslands in two areas around Grande Prairie and Fairview. Air-photo interpretation provided the best means of locating small remnants and fieldwork included inventory of plant and butterfly species as well as assessment of range health. Remnants were mapped using Global Positioning Systems (GPS) and Geographical Information Systems (GIS) technology, which provided an electronic dataset, useful for planning.

As a result of the first year of this project, the documented area of native grasslands in the Peace River region has more than tripled. Conservation efforts should target the medium (10.1-30 ha) and large (30.1-65.0 ha) remnants first, as collectively they contribute the greatest area (87%), and should be easier to manage and maintain at a self-functioning size. The smaller remnants, which are the majority of sites, offer management challenges, which will require unique strategies to maintain them in their natural state.

In the future we will apply proven techniques of locating remnants from the pilot project to the entire white (settled) zone of the Northwest region. Continued work to further understand the relationship between butterflies and the native grassland on which they live, will be important to fill the current knowledge gaps that exist. The discovery of many new sites indicated that there is a need to work with landowners to conserve and maintain native grasslands that remain in the Peace Parkland region. Conservation of the sites through stewardship will become the primary means of protecting remnant native grasslands of the Peace Parkland region.

1.0 INTRODUCTION

Grasslands, which were once extensive and contiguous throughout the Peace River region, are now confined to small, scattered remnants in the uplands, and larger areas on south and west facing slopes of the Peace River and its tributaries (Alberta Environmental Protection 1997). Based on early survey data from Bezanson (1907), Kelly (1910), Macoun (1904), Mair (1908), and Wright (1930), cited in Wilkinson (1981), native grasslands covered an estimated 435,264 to 1,128,935 hectares in the Grande Prairie, Spirit River and Peace River areas. Less than a century later, the author estimates that less than 0.5% of the historical area of upland native grassland remains in the Peace River region.

Native grasslands were utilised for hay and pasture for cattle and horses as early as the late 1800s in the Spirit River area (Leonard 2000). The openness and rich soils under the grasslands ensured that these were the first areas to be cultivated when settlers arrived in the region in the early 1900s to homestead and establish widespread agriculture in the north (Leonard 2000). Towns and settlements scattered throughout the northwest testify to the importance of these open grasslands (prairies) through their names (e.g. Grande Prairie, High Prairie, Big Prairie, Salt Prairie, Paddle Prairie, John D'or Prairie, Buffalo Head Prairie, Wilson Prairie, Savage Prairie, Clear Prairie, Little Prairie, Prairie Echo, and Prairie Point).

The wide-scale loss of native grassland can be attributed to the expansion of cultivation and grazing, urbanisation, industrial development, encroachment of forests and shrub lands, and competition with non-native species (from tame pastures and invasive weeds). These factors have impacted all parkland areas of Alberta. However, the Peace River Parkland has undergone the most extensive alteration of all Alberta's parklands and fragmentation is recognised as the most serious threat to biological diversity within the region (Alberta Environmental Protection 1997).

Native grasslands are home to a diverse and interdependent mix of insects, birds, plants and mammals. The grasslands of the Peace River Parkland support a number of disjunct plant species (Alberta Environmental Protection 1997). Important relationships also exist between native grasslands and butterflies. For example, the larvae of the plains skipper (*Hesperia comma assiniboia*), Alberta arctic (*Oeneis alberta*) and Uhler's Arctic (*Oeneis uhleri varuna*) feed predominantly on native grasses and have disjunct populations in the Peace River area (Hervieux 2002). Native grasslands also provide habitat for vulnerable plant species like the leather grape fern (*Botrychium multifidum*; general status May be at Risk). Maintaining and conserving grasslands has the potential to conserve multiple species associated with or dependant upon these areas.

There has been little opportunity to study the grasslands of northern Alberta, and they are often overlooked in reference material and maps. The lack of information about native grasslands in the uplands of the Peace Parkland has also precluded their inclusion in recent descriptions and management recommendations of grasslands found in the Peace River Parkland, and these recommendations are restricted to the plant communities found

on the river slopes; e.g. "Guide to using native plants in Reclamation" (Gerling *et al.* 1999), and "Range Health Assessment" (Adams *et al.* 2000).

This project was initiated to increase knowledge about the Peace native grasslands. In particular, managers required information on the amount, location and condition of remnant patches, as well as the conservation threats and land use pressures. Using current Global Positioning System (GPS) and Geographical Information System (GIS) technology, conservation planning can be quickly visualised through the expediency and accuracy of spatially mapped information. This basic information will help to focus and coordinate the stewardship and conservation of native grasslands in the Peace region. In addition, data from the study of these remnants can be used by government, conservation organizations, reclamation industry and landowners for developing recommendations for management of these areas.

1.1 Goals and Objectives

The goal of the Peace Native Grassland Program was to identify and conserve native grassland remnants in the Northwest region. Specific objectives included, to:

1. Identify native grassland remnants by compiling existing information and identifying undocumented sites;
2. Inventory sites, collect vegetation information, and assess range health;
3. Document the presence of butterflies associated with native grassland habitats in association with the Peace Parkland Butterfly Survey.
4. Map remnants spatially, for use in GIS; and
5. Use information collected to direct stewardship activities:
   a) Inform landowners of the conservation value of their property;
   b) Provide information on the unique characteristics of native grasslands;
   c) Provide information on the economic and social benefits of maintaining sites; and
   d) Encourage landowners to participate in conservation easements, management agreements, land acquisition and other stewardship options to maintain areas.

2.0 STUDY AREA

2.1 General Description

The Northwest administrative region for Alberta Conservation Association (ACA) and Alberta Sustainable Resource Development covers 229,215 km sq, which is 34% of the provincial land base (Alberta Environment 2001). The region is divided into two land management zones: the White (settled) zone, primarily held under private ownership with some crown grazing leases, mineral leases and protected areas, and the Green (forestry) zone, primarily public land and, apart from some protected areas, is mainly used for logging, grazing and oil and gas operations. A variety of recreational activities also occur throughout the area.

This study considered all native grasslands throughout the region, but concentrated on the White zone as it was seen as being more at risk, had historical locations of grasslands, was held under private ownership and had existing resources such as air-photo coverage to enable a complete assessment. The White zone extends from Valleyview in the south to High Level in the north, and Slave Lake in the east to the Alberta/British Columbia border in the west. This area covers 43,203 km sq or 9% of the provincial land mass.

2.2 Pilot Area for Method Comparison

In 2001, the study concentrated on the Grande Prairie and Fairview areas. A pilot area within these areas was selected to determine the best method of locating remnants. Two areas, each approximately eight townships in size, were selected for the pilot. Each was known to contain native grasslands and was representative of the landscape found in the Fairview and Grande Prairie areas. Only the area in Grande Prairie was completed in 2001 due to the unavailability of air-photos for the Fairview area.

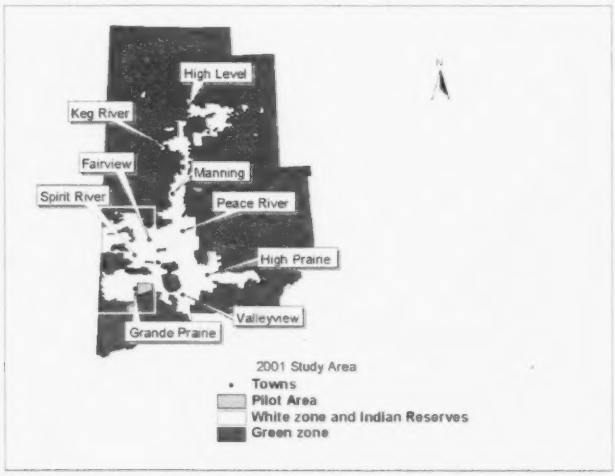

Figure 1. Northwest region of Alberta - Study and pilot areas of the Peace Native Grasslands Program, 2001.

2.3 Vegetation

Native grasslands contain a diverse mixture of grasses, forbs, and shrubs. Moss (1952) identified 36 species of grasses, sedges and rushes, 84 species of forbs and 19 species of woody plants for a total of 139 species of vascular plants in the Peace region. Native grasslands in the Peace are found on river slopes, uplands and lowlands and the plant assemblages differ under these various conditions. Our study focussed on upland native grasslands described by Moss (1952) as a wheat grass (*Agropyron*)- needle grass (*Stipa*) faciation of a wheat grass – needle grass – sedge (*Carex*) plant community. Other botanists have classified these native grasslands as sedge – intermediate oatgrass (*Danthonia intermedia*) – western porcupine grass (*Stipa spartea* var. *curtiseta*) communities (Wilkinson 1981) and (*Agropyron trachycaulum* var. *unilaterale*) – porcupine grass (*Stipa spartea*) – intermediate oat grass – sedge type (Wallis 1982). For a comprehensive overview of these community types see Vujnovic and Bentz (2001).

3.0 METHODS

3.1 Identifying Native Grasslands

To locate remaining native grasslands, we used word of mouth, previous studies, government databases, happenstance, and air-photo interpretation. Air-photo interpretation gave the most number of potential sites and identified even small remnants. An experienced air-photo interpreter was contracted to interpret images for upland native grassland remnants in the White zone. The most recent available black and white air-photos, primarily at a scale of 1:30,000 (sometimes 1:40,000), were used to identify potential native grasslands. Interpretation was to 3-4 ha in size, or as small as could be discerned. Potential sites were outlined on a clear film 1:50,000 scale mapsheet that showed a 1998 Indian Resources Satellite (IRS) image and Alberta Township System (ATS) information. Completed mapsheets were used for field verification.

Historical descriptions from surveyors and pioneers were reviewed, and existing survey, land use, soil and vegetation maps were examined to see if this would identify targets on which to focus. While this gave a general idea of historical locations, the wide scale cultivation of the grassland since settlement has altered the landscape so much that these records could not accurately pinpoint the small remnants left today. In the Peace River region, solonetzic soils play an important role in maintaining grasslands through the inhibition of tree root growth (Wilkinson 1981, Wilkinson and Johnson 1983). However soil conditions do not fully explain the location of all grasslands in the Peace (Wilkinson 1981, Wilkinson and Johnson 1983). The use of satellite imagery was also investigated, but as it is hard to reliably differentiate between tame and native grasses, this method was not recommended by similar studies being undertaken in Alberta's Grassland and Central Parkland natural regions (R. Bjorge *pers comm*).

3.2 Field Inventory and Mapping

Often, researchers and rangeland specialists use indicator plant species or standard ecological site descriptions to determine plant community type. This information was very limited for upland native grasslands of the Peace Parkland and we first needed to gather the baseline data, which can be used to formulate these approaches. We also needed to verify the accuracy of the air-photo interpretation pilot. These needs were addressed through the collection of baseline data between June and August 2001.

We used the term "site" to refer to a quarter section (65 hectares in size). Within each site, "polygons" were open grassland areas separated by topography, vegetation or distance and each site could have multiple polygons. At each site, we familiarized ourselves with the polygons by traversing them, recording the presence of all plant species in the grassland and estimating plant species composition. If a polygon had more than 30% native species, it was classified as being native, if there was more than 70% non-native species it was classed as modified (Adams *et al.* 2000) and no further work was undertaken.

3.2.1 Vegetation Inventory

The most representative polygon of native grassland at each site was chosen for detailed vegetation sampling using the method described by Robertson and Adams (1990). The composition of plant species was estimated by listing each plant species present along with its cover estimate. Plants were identified to the species level where possible following the classification of Moss (1983). The cover estimate was determined using a Daubenmire cover class, which was assigned to each plant species, litter, exposed soil, and moss/lichen within each frame (plot). A 20 cm x 50 cm frame was used to delineate the sample area. Ten frames (or 5 if the site was extremely small) were sampled in the polygon. Frames were located at regular intervals measured along a traverse line, which generally cut through the middle of the polygon. Woody species growing in the grassland within the polygon were described using an estimated density distribution, height and percent area covered.

3.2.2 Range Health

To determine the ability of a site to perform certain functions, we assessed its health using the recently developed "Range/Pasture Health Assessment Short Form" (Adams *et al.* 2000). This assessment compares a site's ecological processes (integrity and ecological status, community structure, hydrological function and nutrient cycling, site stability and noxious weeds) with a standard or reference plant community. The reference plant community is the potential natural community for the site under light grazing disturbance. There were limited standard plant communities to refer to for upland native grasslands of the Peace Parkland, so a basic description was formulated under the guidance of Colin Stone, Range Management Specialist, Public Lands, Peace River.

3.2.3 Butterflies

We recorded all butterflies seen, weather conditions and total survey time when visiting native grassland sites; these were the protocols developed by Hervieux (2001). We paid particular attention to observations of the plains skipper, Pike's Old World swallowtail (*Papilio machaon pikei*), coral hairstreak (*Satyrium titus*), striped hairstreak (*Satyrium liparops*), Gorgone checkerspot (*Chlosyne gorgone carlota*), northern checkerspot (*Chlosyne palla*), Uhler's arctic and Alberta arctic. We did not collect information when it was cloudy, extremely windy, or rainy so not all native grassland sites were inventoried for butterflies. Adult butterflies were identified by sight, using Bird *et al.* (1995), usually after capture with an insect net. Some individuals were collected for future DNA analysis by the University of Alberta and for a reference collection being developed by Alberta Fish and Wildlife. Data was submitted to the Peace Parkland Butterfly Survey and also sent to the Alberta Natural Heritage Information Centre (ANHIC).

3.2.4 Rare Plants

Prior to the field season, ANHIC provided all known occurrence records of tracked plants found in the Peace Parkland. Through consultation with ANHIC and Species at Risk

staff, we developed a list of rare and tracked plant species that might be found in this study. Under the current Alberta species risk assessments (Anon 2001), there was one "may-be-at-risk" species and 13 species whose status was "in-preparation" that were likely to be found in native grassland uplands of the Peace Parkland. During the traverse of the site and vegetation inventory, every effort was made to look in microhabitats that had the potential to support rare or tracked plant species. Observations of tracked plant species were recorded and submitted to ANHIC using their rare plant guidelines.

3.2.5 Mapping

A hand held GPS unit was used to record the location of each Daubenmire frame. The perimeter of the native grassland where the grassland met shrubs taller than 0.5 metres, or some other barrier (e.g. cultivation, fence-line, water body etc.) was traversed and recorded with the GPS. This gave an estimation of area and was incorporated into a GIS, which was used to map native grassland locations.

3.3 Stewardship

Landowner support was an important element of this project. After ownership of sites was determined, landowners were contacted for permission to enter their land and were invited to accompany staff during the field inspection. As follow-up to the visit, landowners were sent a copy of the list of plant species that were observed at the site.

4.0 RESULTS

4.1 Location of Native Grassland Remnants

Using the methods described above to locate potential remnants, 110 sites were identified within the Fairview and Grande Prairie areas. Of these, 83 (75%) sites were field checked and 43 (39%) sites were classified as having native upland grassland remnants. For various reasons, 4 sites were not accessed but an assessment "over the fence" was conducted and the results are included as part of the data set. The majority of native sites were concentrated around the Kleskun Hills, east of Grande Prairie. Three sites were located outside the method-comparison-pilot-area with one site located west of Grande Prairie near Saskatoon Lake and the other two south of Fairview. The location of these sites is considered sensitive information but will be made available to project partners for stewardship planning.

4.2 Area of Native Grassland Remnants

The native grassland remnants verified during 2001 covered a total area of 480 ha. The size of each remnant varied in size from 0.1 to 50.7 ha with an average size of 11.2 ha. Table 1 compares the area and number of sites in each size category. Nearly 60% (25) of the sites were less than 10.0 ha in size and while only 12% of the sites were in the 30.1-65.0 ha size range, these 5 sites represented almost half (45.8%) of the native grasslands. It also shows that the highest number of sites (38%) were under 3.0 ha but covered less than 4% (18.3 ha) of the total area.

Table 1. Area (ha, %) and number (#, %) of upland native grassland remnants in each size category within the studied areas of Grande Prairie and Fairview, 2001 (n=43)

Remnant Size (ha)	< 1.0	1.1 - 3.0	3.1 - 10.0	10.1 - 30.0	30.1 - 65.0	Total
Total area (ha)	1.9 (0.4%)	16.4 (3.4%)	43.0 (9.0%)	198.8 (41.4%)	219.6 (45.8%)	479.7
Number of Sites (#)	8 (19%)	8 (19%)	9 (21%)	13 (30%)	5 (12%)	43

4.3 Vegetation Inventory

Detailed vegetation inventories were conducted on 37 (86%) of the 43 verified native upland grassland sites. The total number of species (shrubs, grasses, and forbs) that were identified through the inventory was 117. Of these, there were 69 native forbs, 26 native grasses and grass-like species, 15 native shrubs and 7 introduced forbs and grasses. An additional 61 vascular species were identified during the traverse portion of the site inspections.

Plant diversity at each native site ranged from 15 to 41 species with an average of 27. The occurrence of introduced grasses and forbs was generally quite low at each site (maximum of three and two respectively) and there were four sites with no introduced

species identified. Native forbs generally contributed the largest proportion of species with between 11 and 28 species and an average of 19 at each site. Native grasses in turn provided between 4 and 14 species with an average of 9 at each site. Up to 8 shrub species were identified at an individual site.

4.4 Range Health

A range health assessment was done at each of the 37 inventoried native grassland sites. Sites could be rated as healthy, healthy with problems, or unhealthy. None of the sites were unhealthy, 32% (12 sites) were healthy with problems, and 68% (25 sites) were healthy. Approximately half (14 sites) of the healthy sites scored a perfect rating of 100%. Factors that affected the rating of sites included significant alterations in the plant community due to grazing or other disturbances, missing life form layers, and reduced amounts of litter. Most sites were stable with little evidence of accelerated erosion, and none of the sites had a noxious weed problem. Generally, the number of native forbs increased as range health improved and the number of grass species stayed the same, though the species and their abundance often changed. As a reference and comparison, range health was also assessed at eight other sites that were accessed (native shrub, slope, modified).

4.5 Butterflies

Observations of 20 butterfly species were recorded at one third (13/37) of the inventoried upland native grassland sites, at one native shrub site and one modified grassland site. Two tracked species were observed; the plains skipper was recorded at five sites and the coral hairstreak at one site. The sites where these two species were observed had average or higher plant species diversity, a range health of healthy or healthy with problems, and were between 2.5 – 32.5 ha in area. Three other possibly disjunct species were also observed, the common ringlet (*Coenonympha inornata*), great spangled fritillary (*Speyeria cybele*) and garita skipper (*Oarisma garita*).

4.6 Rare Plants

Leather grape fern, assessed as a "May be at Risk" fern in Alberta, was observed at eight native grassland sites and one modified grassland site. Most of these sites were grazed and, apart from the one modified grassland site, were in a healthy range condition (greater than 72% health score).

4.7 Stewardship

Most of the sites were on privately owned land and we had the opportunity to speak with over 50 landowners. Only 4 of the 50 landowners withheld permission to access their land. Some landowners were sceptical about our interest in their native grassland. However, those we were able to speak with after completing the site assessment, expressed interest in the variety of plant species and in ways that they could maintain their sites.

4.8 Mapping and Data Storage

An electronic and hardcopy map of potential and confirmed upland native grassland remnants has been produced and is available to project partners. The original is housed at ACA in Peace River. Information on the distribution of rare plants and uncommon butterflies is considered sensitive information and is not included here.

5.0 DISCUSSION AND FUTURE DIRECTIONS

When this project started, there were two commonly known and documented sites of remnant upland native grassland in the Grande Praîrie area - Kleskun Hills Natural Area, and the Cochrane site. These two sites had a combined area of 143 ha. As a result of the first year of this project, the documented area of native grasslands in the Peace River region has more than tripled to 480 ha. More work is needed to complete the identification of remnants in the Grande Prairie and Fairview areas, and to expand the coverage to the rest of the White zone in the Peace River region will probably result in the identification of additional sites. To increase efficiency and maximize cost effectiveness of the air-photo interpretation, other lands of conservation interest (e.g., river breaks and wetlands) could be assessed at the same time.

Nearly all the native grassland remnants in the pilot area are concentrated within a ten-mile radius of the Kleskun Hills Natural Area, which makes this an important area to focus conservation and stewardship activities. While every site is important and valuable to conserve, efforts should target the medium (10.1-30 ha) and large (30.1-65.0 ha) remnants first, as they contribute the greatest area (87%), and should be easier to manage and maintain at a self-functioning size. The three largest sites are already protected as a Natural Area (Kleskun Hills Natural Area) or owned by a conservation organization (Cochrane Ranch). While other remnants may be protected in the future, they are currently under private ownership and are being utilized for agricultural production in the form of grazing or idle land. These sites offer a good opportunity to be maintained through voluntary landowner stewardship that may include management strategies like grazing or burning practices, and protection against land development, especially residential subdivision.

The majority of sites (59%) had remnants under 10.0 ha in size, which contributed to 13% of the total area. The medium-small (3.1-10.0 ha) remnants cover 9% of the area and due to an overall contribution and close proximity to larger remnants are important to maintain. The cost/area may be high due to the small area, but individual remnants would benefit from management strategies that can buffer them from encroachment of shrubs and introduced plants like awnless brome (*Bromus inermis*), and Kentucky bluegrass (*Poa pratensis*) while potentially increasing the area of native grassland.

Small remnants (1.1-2.0 ha) cover 3.4% of the area, and will hold the greatest challenge for conservation and management because they may be subject to the spread of introduced plants or native shrubs. The cost (financial and time) to maintain these small sites could be prohibitive. However, as long as they are intact, they contribute to local biodiversity and may provide important habitat for some species of butterflies (M. Hervieux, *pers comm.*).

The smallest sites (<1.0 ha) only cover 0.4% of the area and if they are not close to one another to provide effective habitat for butterflies, may not be cost or time effective to secure. However, even these small sites may be important as sources of genetic material to help in the conservation of native grasslands in the Peace River region.

Landowners were interested in the results of this study, especially information concerning plant species that occurred on their property. Landowners also had questions about ways to best manage the native grassland, and why they are so important. A brochure or fact sheet that provides this information would help landowners and promote conservation of native grasslands. A short questionnaire about the landowners' interest in conservation is planned for 2002/2003 to help facilitate land stewardship efforts.

Vegetation data collected through the inventory has been helpful to gain a broader picture of the plant composition of the upland remnants. Further inventories at more sites, will increase this knowledge and can be used to make more accurate descriptions of reference plant community types. It will also give a better sense of the overall diversity of native grassland plant communities growing in the Peace River region.

There is limited knowledge about the food and nectar sources required for individual butterfly species. Further work on plant community types that support particular butterfly species may bridge this gap, and potentially, indicator species could be used to predict butterfly occurrences. This would be especially helpful as butterflies vary within a season (flight time and climatic conditions) and between seasons, so it is difficult to observe all species on a single visit. Documenting the phenology of plants and corresponding butterflies present may also help with this analysis and will be incorporated in future years.

The discovery of many overlooked remnants indicates that there is a need to work with landowners to conserve these areas and to inform people that native grasslands are an important part of the Peace River region landscape.

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APPENDIX A.

Plants identified on upland native grasslands remnants, in the Peace region of Northwest Alberta, by the *Peace Native Grassland Program*, 2001.

	Scientific Name	Common name	Family
	FORBS		
	Achillea millefolium	common yarrow	Compositae
*	*Agoseris glauca*	yellow false dandelion	Compositae
*	*Agrimonia striata*	agrimony	Rosaceae
	Allium cernuum	nodding onion	Liliaceae
*	*Allium schoenoprasum*	wild chives	Liliaceae
	Allium textile	prairie onion	Liliaceae
	Androsace septentrionalis	northern fairy candelabra	Primulaceae
	Anemone	anemone	Ranunculaceae
	Anemone canadensis	Canada anemone	Ranunculaceae
	Anemone cylindrica	long-fruited anemone	Ranunculaceae
*	*Anemone multifida*	cut-leaved anemone	Ranunculaceae
	Anemone patens	prairie crocus	Ranunculaceae
	Antennaria	Everlasting	Compositae
	Antennaria neglecta	broad-leaved everlasting	Compositae
	Antennaria parvifolia	small-leaved everlasting	Compositae
*	*Arabis*	rock cress	Cruciferae
	Arnica	arnica	Compositae
*	*Arnica chamissonis*	leafy arnica	Compositae
	Arnica cordifolia	heart-leaved arnica	Compositae
	Arnica fulgens	shining arnica	Compositae
	Artemisia	artemisia	Compositae
	Artemisia biennis	biennial sagewort	Compositae
	Artemisia campestris	plains wormwood	Compositae
	Artemisia frigida	pasture sagewort	Compositae
	Artemisia ludoviciana	prairie sagewort	Compositae
	Aster	aster	Compositae
	Aster conspicuus	showy aster	Compositae
	Aster ericoides	tufted white prairie aster	Compositae
	Aster laevis	smooth aster	Compositae
	Astragalus	milk vetch	Leguminosae
*	*Atriplex nuttallii (from Moss)*	Nuttall's atriplex	Chenopodiaceae
	Botrychium multifidum	leather grape fern	Ophioglossaceae
*	*Brassica*	mustard	Cruciferae
	Campanula rotundifolia	harebell	Campanulaceae
*	*Capsella bursa-pastoris*	shepherd's-purse	Cruciferae
	Castilleja miniata	common red paintbrush	Scrophulariaceae
	Cerastium	chickweed	Caryophyllaceae
	Cerastium arvense	field mouse-ear chickweed	Caryophyllaceae
*	*Chenopodium album*	lamb's-quarters	Chenopodiaceae

*	*Cicuta maculata*	water-hemlock	Umbelliferae
*	*Cirsium*	thistle	Compositae
	Cirsium drummondii	Drummond's thistle	Compositae
	Comandra umbellata	bastard toadflax	Santalaceae
*	*Cornus canadensis*	bunchberry	Cornaceae
*	*Delphinium glaucum*	tall larkspur	Ranunculaceae
*	*Descurainia sophia*	flixweed	Cruciferae
*	*Dracocephalum parviflorum*	American dragonhead	Labiatae
*	*Epilobium angustifolium*	common fireweed	Onagraceae
*	*Equisetum*	horsetail	Equisetaceae
	Erigeron	fleabane	Compositae
	Erigeron caespitosus	tufted fleabane	Compositae
	Erigeron glabellus	smooth fleabane	Compositae
	Erigeron philadelphicus	Philadelphia fleabane	Compositae
	Fragaria virginiana	wild strawberry	Rosaceae
	Galium boreale	northern bedstraw	Rubiaceae
*	*Gentianella*	gentian/felwort	Gentianaceae
	Gentianella amarella	felwort	Gentianaceae
	Geum triflorum	three-flowered avens	Rosaceae
	Grindelia squarrosa	gumweed	Compositae
*	*Habenaria*	bog orchid	Orchidaceae
	Hedysarum alpinum	alpine hedysarum	Leguminosae
*	*Helianthus*	sunflower	Compositae
*	*Helianthus annuus*	common annual sunflower	Compositae
*	*Heracleum lanatum*	cow parsnip	Umbelliferae
	Heuchera richardsonii	Richardson's alumroot	Saxifragaceae
	Hieracium umbellatum	narrow-leaved hawkweed	Compositae
	Lathyrus ochroleucus	cream-colored vetchling	Leguminosae
	Lilium philadelphicum	western wood lily	Liliaceae
	Linum lewisii	wild blue flax	Linaceae
	Maianthemum canadense	wild lily-of-the-valley	Liliaceae
*	*Matricaria perforata*	scentless chamomile	Compositae
*	*Medicago sativa*	alfalfa	Leguminosae
*	*Melilotus officinalis*	yellow sweet-clover	Leguminosae
*	*Mertensia paniculata*	tall lungwort	Boraginaceae
	Monarda fistulosa	wild bergamot	Labiatae
*	*Opuntia fragilis*	brittle prickly-pear	Cactaceae
	Orthocarpus luteus	owl-clover	Scrophulariaceae
	Oxytropis	locoweed	Leguminosae
*	*Oxytropis sericea*	early yellow locoweed	Leguminosae
	Oxytropis splendens	showy locoweed	Leguminosae
*	*Penstemon gracilis*	lilac-flowered beardtongue	Scrophulariaceae
	Penstemon procerus	slender blue beardtongue	Scrophulariaceae
*	*Plantago major*	common plantain	Plantaginaceae
	Potentilla	cinquefoil	Rosaceae
	Potentilla arguta	white cinquefoil	Rosaceae

	Potentilla gracilis	graceful cinquefoil	Rosaceae
	Potentilla hippiana	woolly cinquefoil	Rosaceae
*	*Ranunculus*	buttercup	Ranunculaceae
*	*Ranunculus acris*	tall buttercup	Ranunculaceae
	Ranunculus macounii	Macoun's buttercup	Ranunculaceae
*	*Rumex*	dock	Polygonaceae
	Sedum lanceolatum	lance-leaved stonecrop	Crassulaceae
	Selaginella densa	prairie selaginella	Selaginellaceae
*	*Senecio eremophilus*	cut-leaved ragwort	Compositae
	Sisyrinchium montanum	common blue-eyed grass	Iridaceae
	Smilacina stellata	star-flowered Solomon's seal	Liliaceae
	Solidago	goldenrod	Compositae
*	*Solidago canadensis*	Canada goldenrod	Compositae
	Solidago missouriensis	low goldenrod	Compositae
	Solidago spathulata	mountain goldenrod	Compositae
*	*Sonchus*	sow thistle	Compositae
*	*Spiranthes romanzoffiana*	hooded ladies'-tresses	Orchidaceae
	Stellaria	chickweed	Caryophyllaceae
*	*Tanacetum vulgare*	common tansy	Compositae
	Taraxacum officinale	common dandelion	Compositae
	Thalictrum venulosum	veiny meadow rue	Ranunculaceae
*	*Thlaspi arvense*	stinkweed	Cruciferae
*	*Tragopogon dubius*	common goat's-beard	Compositae
	Trifolium	clover	Leguminosae
	Trifolium hybridum	alsike clover	Leguminosae
*	*Trifolium pratense*	red clover	Leguminosae
*	*Trifolium repens*	white clover	Leguminosae
*	*Urtica dioica*	common nettle	Urticaceae
	Vicia americana	wild vetch	Leguminosae
*	*Viola canadensis*	western Canada violet	Violaceae
	Viola adunca	early blue violet	Violaceae
*	*Zizia aptera*	heart-leaved Alexanders	Umbelliferae

GRASSES and GRASS-LIKES

Agropyron	wheat grass	Gramineae
Agropyron dasystachyum	northern wheat grass	Gramineae
Agropyron repens	quack grass	Gramineae
Agropyron smithii	western wheat grass	Gramineae
Agropyron trachycaulum	slender wheat grass	Gramineae
Agropyron trachycaulum var. unilaterale	awned wheat grass	Gramineae
Agrostis scabra	rough hair grass	Gramineae
* *Avena fatua*	wild oat	Gramineae
* *Bromus ciliatus*	fringed brome	Gramineae
Bromus inermis	awnless brome	Gramineae
* *Bromus pumpellianus* (from Moss)	northern awnless brome	Gramineae

	Calamagrostis	reed grass	Gramineae
*	*Calamagrostis canadensis*	bluejoint	Gramineae
	Calamagrostis inexpansa	northern reed grass	Gramineae
	Calamagrostis montanensis	plains reed grass	Gramineae
	Calamagrostis purpurascens	purple reed grass	Gramineae
	Carex	sedge	Cyperaceae
	Danthonia intermedia	intermediate oat grass	Gramineae
	Deschampsia cespitosa	tufted hair grass	Gramineae
*	*Elymus innovatus*	hairy wild rye	Gramineae
*	*Festuca rubra*	red fescue	Gramineae
	Festuca saximontana	Rocky Mountain fescue	Gramineae
	Helictotrichon hookeri	Hooker's oat grass	Gramineae
*	*Hierochloe odorata*	sweet grass	Gramineae
*	*Hordeum jubatum*	foxtail barley	Gramineae
	Juncus	rush	Juncaceae
	Koeleria macrantha	June grass	Gramineae
	Muhlenbergia richardsonis	mat muhly	Gramineae
	Phleum pratense	timothy	Gramineae
	Poa	bluegrass	Gramineae
	Poa compressa	Canada bluegrass	Gramineae
*	*Poa interior*	inland bluegrass	Gramineae
	Poa palustris	fowl bluegrass	Gramineae
	Poa pratensis	Kentucky bluegrass	Gramineae
	Poa sandbergii	Sandberg bluegrass	Gramineae
	Schizachne purpurascens	purple oat grass	Gramineae
*	*Scirpus*	bulrush	Cyperaceae
*	*Stipa columbiana*	Columbia needle grass	Gramineae
*	*Stipa comata*	needle-and-thread	Gramineae
	Stipa curtiseta	western porcupine grass	Gramineae
	Stipa richardsonii	Richardson needle grass	Gramineae
	Stipa viridula	green needle grass	Gramineae
*	*Triticum aestivum*	common wheat	Gramineae
*	*Typha latifolia*	common cattail	Typhaceae

SHRUBS

*	*Alnus*	alder	Betulaceae
	Amelanchier alnifolia	saskatoon	Rosaceae
	Arctostaphylos uva-ursi	common bearberry	Ericaceae
	Cornus stolonifera	red-osier dogwood	Cornaceae
	Elaeagnus commutata	silverberry	Elaeagnaceae
	Juniper	Juniper	Cupressaceae
*	*Juniperus communis*	ground juniper	Cupressaceae
	Juniperus horizontalis	creeping juniper	Cupressaceae
*	*Lonicera dioica*	twining honeysuckle	Caprifoliaceae
	Lonicera involucrata	bracted honeysuckle	Caprifoliaceae
	Populus tremuloides	aspen	Salicaceae

	Ribes oxyacanthoides	northern gooseberry	Grossulariaceae
	Ribes triste	wild red currant	Grossulariaceae
	Rosa	rose	Rosaceae
	Rubus idaeus	wild red raspberry	Rosaceae
	Salix	willow	Salicaceae
	Shepherdia canadensis	Canada buffaloberry	Elaeagnaceae
	Symphoricarpos occidentalis	buckbrush	Caprifoliaceae
*	*Vaccinium myrtilloides*	common blueberry	Ericaceae

* identified during the traverse, but were not recorded in the vegetation inventory

Source used for common names:
Alberta Environmental Protection. 1993. *Alberta Plants and Fungi - Master Species List and Species Group Checklists*. Edmonton.

APPENDIX B.

Butterflies observed by *Peace Native Grasslands Program*, in the Peace River region during 2001

Skippers	
*Plains Skipper	*Hesperia comma assiniboia*
**Garita Skipper	*Oarisma garita*
Long-dash Skipper	*Polites mystic*
Swallowtails	
Swallowtail sp.	
Whites, Marbles and Sulphurs	
Cabbage White	*Pieris rapae*
White sp.	
Sulphur sp.	
Coppers, Hairstreaks and Blues	
*Coral Hairstreak	*Satyrium titus*
Northern Blue	*Lycaeides idas*
Blue sp.	
Tortoiseshells, Admirals and Anglewings	
White Admiral	*Limenitis arthemis*
Fritillaries	
Meadow Fritillary	*Boloria bellona*
Aphrodite Fritillary	*Speyeria aphrodite*
Northwestern Fritillary	*Speyeria electa*
**Great Spangled Fritillary	*Speyeria cybele pseudocarpenterii*
Mormon Fritillary	*Speyeria mormonia*
Greater Fritillary sp.	
Checkerspots and Crescents	
Northern Pearl Crescent	*Phyciodes cocyta*
Satyrs	
Common Wood Nymph	*Cercyonis pegala*
**Common (Inornate) Ringlet	*Coenonympha inornata*

*** = tracked butterflies found in Peace River region**
**** = disjunct Alberta butterflies found in Peace River region**

7.0 LIST OF TITLES IN THIS SERIES

(as of February 2004)

No. 1 Alberta species at risk program and projects 2000-2001, by Alberta Sustainable Resource Development, Fish and Wildlife Division. (2001)

No. 2 Survey of the peregrine falcon (*Falco peregrinus anatum*) in Alberta, by R. Corrigan. (2001)

No. 3 Distribution and relative abundance of the shortjaw cisco (*Coregonus zenithicus*) in Alberta, by M. Steinhilber and L. Rhude. (2001)

No. 4 Survey of the bats of central and northwestern Alberta, by M.J. Vonhof and D. Hobson. (2001)

No. 5 2000 survey of the Trumpeter Swan (*Cygnus buccinator*) in Alberta, by M.L. James and A. James. (2001)

No. 6 2000/2001 Brassy Minnow inventory at Musreau Lake and outlet, by T. Ripley. (2001)

No. 7 Colonial nesting waterbird survey in the Northwest Boreal Region – 2000, by M. Hanneman and M. Heckbert. (2001)

No. 8 Burrowing owl trend block survey and monitoring - Brooks and Hanna areas, by D. Scobie and R. Russell. (2000)

No. 9 Survey of the Lake Sturgeon (*Acipenser fulvescens*) fishery on the South Saskatchewan River, Alberta (June-September, 2000), by L.A. Winkel. (2000)

No. 10 An evaluation of grizzly bear-human conflict in the Northwest Boreal Region of Alberta (1991-2000) and potential mitigation, by T. Augustyn. (2001)

No. 11 Harlequin duck monitoring in the Northern East Slopes of Alberta: 1998-2000 preliminary results, by J. Kneteman and A. Hubbs. (2000)

No. 12 Distribution of selected small mammals in Alberta, by L. Engley and M. Norton. (2001)

No. 13 Northern leopard frog reintroduction. Raven River - Year 2 (2000), by K. Kendell. (2001)

No. 14 Cumulative effects of watershed disturbances on fish communities in the Kakwa and Simonette watersheds. The Northern Watershed Project. Study 3 Progress report, by T. Thera and A. Wildeman. (2001)

No. 15 Harlequin duck research in Kananaskis Country in 2000, by C.M. Smith. (2001)

No. 16 Proposed monitoring plan for harlequin ducks in the Bow Region of Alberta, by C.M. Smith. (2001)

No. 17 Distribution and relative abundance of small mammals of the western plains of Alberta as determined from great horned owl pellets, by D. Schowalter. (2001)

No. 18 Western blue flag (*Iris missouriensis*) in Alberta: a census of naturally occurring populations for 2000, by R. Ernst. (2000)

No. 19 Assessing chick survival of sage grouse in Canada, by C.L. Aldridge. (2000)

No. 20 Harlequin duck surveys of the Oldman River Basin in 2000, by D. Paton. (2000)

No. 21 Proposed protocols for inventories of rare plants of the Grassland Natural Region, by C. Wallis. (2001)

No. 22 Utilization of airphoto interpretation to locate prairie rattlesnake (*Crotalus viridis viridis*) hibernacula in the South Saskatchewan River valley, by J. Nicholson and S. Rose. (2001)

No. 23 2000/2001 Progress report on caribou research in west central Alberta, by T. Szkorupa. (2001)

No. 24 Census of swift fox (*Vulpes velox*) in Canada and Northern Montana: 2000-2001, by A. Moehrenschlager and C. Moehrenschlager. (2001)

No. 25 Population estimate and habitat associations of the long-billed curlew in Alberta, by E.J. Saunders. (2001)

No. 26 Aerial reconnaissance for piping plover habitat in east-central Alberta, May 2001, by D.R.C. Prescott. (2001)

No. 27 The 2001 international piping plover census in Alberta, by D.R.C. Prescott. (2001)

No. 28 Prairie rattlesnake (*Crotalus viridis viridis*) monitoring in Alberta – preliminary investigations (2000), by S.L. Rosé. (2001)

No. 29 A survey of short-horned lizard (*Phrynosoma hernandesi hernandesi*) populations in Alberta, by J. James. (2001)

No. 30 Red-sided garter snake (*Thamnophis sirtalis parietalis*) education and relocation project – final report, by L. Takats. (2002)

No. 31 Alberta furbearer harvest data analysis, by K.G. Poole and G. Mowat. (2001)

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No. 34 Peregrine falcon surveys and monitoring in the Parkland Region of Alberta, 2001, by R. Corrigan. (2002)

No. 35 Protocol for monitoring long-toed salamander (*Ambystoma macrodactylum*) populations in Alberta, by T. Pretzlaw, M. Huynh, L. Takats and L. Wilkinson. (2002)

No. 36 Long-toed salamander (*Ambystoma macrodactylum*) monitoring study in Alberta: summary report 1998-2001, by M. Huynh, L. Takats and L. Wilkinson. (2002)

No. 37 Mountain plover habitat and population surveys in Alberta, 2001, by C. Wershler and C. Wallis. (2002)

No. 38 A census and recommendations for management for western blue flag (*Iris missouriensis*) in Alberta, by R. Ernst. (2002)

No. 39 Columbian mountain amphibian surveys, 2001, by D. Paton. (2002)

No. 40 Management and recovery strategies for the Lethbridge population of the prairie rattlesnake, by R. Ernst. (2002)

No. 41 Western (*Aechmophorus occidentalis*) and eared (*Podiceps nigricollis*) grebes of central Alberta: inventory, survey techniques and management concerns, by S. Hanus, H. Wollis and L. Wilkinson. (2002)

No. 42 Northern leopard frog reintroduction – year 3 (2001), by K. Kendell. (2002)

No. 43 Survey protocol for the northern leopard frog, by K. Kendell. (2002)

No. 44 Alberta inventory for the northern leopard frog (2000-2001), by K. Kendell. (2002)

No. 45 Fish species at risk in the Milk and St. Mary drainages, by RL&L Environmental Services Ltd. (2002)

No. 46 Survey of the loggerhead shrike in the southern aspen parkland region, 2000-2001, by H. Kiliaan and D.R.C. Prescott. (2002)

No. 47 Survey of native grassland butterflies in the Peace parkland region of northwestern Alberta – 2001, by M. Hervieux. (2002)

No. 48 Caribou range recovery in Alberta: 2001/02 pilot year, by T. Szkorupa. (2002)

No. 49 Peace parkland native grassland stewardship program 2001/02, by A. Baker. (2002)

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No. 51 2001 Burrowing owl trend block survey and monitoring, Brooks and Hanna areas, by D. Scobie. (2002)

No. 52 An evaluation of the ferruginous hawk population in Alberta based on recent trend data, by D.P. Stepnisky, G.L. Erickson, J. Iwaasa and B. Taylor. (2002)

No. 53 Alberta amphibian call surveys. A pilot year. Final report, by L. Takats and C. Priestley. (2002)

No. 54 Utilization of a roadside survey technique to survey burrowing owl (*Athene cunicularia hypugaea*) in southeastern Alberta, by J. Nicholson and C. Skiftun. (2002)

No. 55 Alberta species at risk program and projects 2001-2002, by Alberta Sustainable Resource Development, Fish and Wildlife Division. (2002)

No. 56 Developing a habitat-based population viability model for greater sage-grouse in southeastern Alberta, by C.L. Aldridge. (2001)

No. 57 Peregrine falcon surveys and monitoring in the Northeast Boreal Region of Alberta, 2001, by R. Corrigan. (2002)

No. 58 2002 burrowing owl trend block survey and monitoring, Brooks area, by R.F. Russell. (2002)

No. 59 Rare plant inventory of the eastern edge of the lower foothills natural subregion, west-central Alberta, by J. Doubt. (2002)

No. 60 Western (*Aechmophorus occidentalis*) and eared (*Podiceps nigricollis*) grebes of central Alberta: 2002 field summary, by S. Hanus, L. Wilkinson and H. Wollis. (2002)

No. 61 Inventory of western spiderwort (*Tradescantia occidentalis*) in Alberta: 2002, by S. Peters. (2003)

No. 62 Bullsnakes (*Pituophis catenifer sayi*) in Alberta: literature review and data compilation, by K.J. Kissner and J. Nicholson. (2003)

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No. 73 Long-toed salamander (*Ambystoma macrodactylum*) conservation in the Alberta foothills: 2002 field summary report, by L. Wilkinson and S. Hanus. (2003)

No. 74 Researching Amphibian Numbers in Alberta (RANA): 2002 provincial summary, by L. Wilkinson and S. Hanus. (2003)

No. 75 Distribution and habitat associations of the long-toed salamander (*Ambystoma macrodactylum*) in the Oldman River drainage, by K. Pearson. (2003)

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No. 78 Northern leopard frog reintroduction: Year 4 (2002), by K. Kendell. (2003)

No. 79 Magrath Northern Leopard Frog Reintroduction Project - Year 1 Progress Report, by K.A. Romanchuck. (2003)

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